

BIS 104-001: Regulation of Cell Function Syllabus

Winter 2008

Lectures: 1:10PM-2:00PM MWF, 3 Kleiber

Professor:

Dr. Ken Kaplan

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Office hours: Tuesday, 3:00-4:30 p.m., Briggs 204

Teaching Assistant:

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Office hours: Wednesday, 3:10 to 4:00 p.m. (Briggs 204)

Discussion Section: Monday, 5:10 to 6:00 p.m. (SLB 3061)

Course Goal: Cellular function lies at the root of all complex and simple biological systems.

Thus, regardless of your major, if you are studying biology you are either studying actual cellular processes or studying outcomes that depend on these processes. This course will expose you to the fundamental mechanisms that allow cells to maintain the system of proteins and biomolecules required for them to replicate with high fidelity, to maintain stable functional states, to differentiate in response to external cues and to ultimately form complex organizations of cells (i.e., tissues).

To guide us on our journey into the workings of the cell, we must first begin to “think” like a cell biologist. To this end, we will apply an experimental approach to a classic problem in cell biology. We will master “blackboard” experimental techniques to allow us to explore the remarkable transformation of a monolayer of cells after being “wounded”. Under such conditions, cells surrounding the wound change their organization and programming in order to migrate, divide, and differentiate to fill in the wound. While the details underlying this process are not fully understood, it is these cellular behaviors that will form the intellectual framework for our discussion.

Website: Find announcements, files, study material and links at your “SmartSite” link for this course.

You can find practice exams, exam keys, problem sets and useful links in the “Resources” section of your SmartSite course page.

Any changes/additions to the course material will be posted as announcements.

Additional material presented in class will be available by clicking on the “Images and Movies” link in your SmartSite navigation bar or by going to the following link on your browser:

<http://www.mcb.ucdavis.edu/faculty-labs/kaplan/>

click on courses, BIS104.

Podcasts: All lectures will be available for podcast:

<http://podcast.ucdavis.edu/app/view.php?pid=283>

Textbook: Cell and Molecular Biology, Gerald Karp, fourth edition. The fifth edition is also acceptable and I will try to post reading assignments from both.

For cell biology majors, you may want to invest in Molecular Biology of The Cell, Bruce Alberts, Fourth Edition (Garland Science).

Reading assignments for each lecture will be posted as an announcement on Smartsite. It is highly recommended that you read this material **BEFORE** class.

Clickers: This year we will be using clickers in class to answer questions that evaluate your understanding of the material and promote class discussion. I will not use your responses to “punish” wrong answers. Rather, as a *participation reward*, you will gain 5 points on your final grade if you answer 80% or more of the questions. As only a few points can separate a “+” from a “-“ letter grade, this can have a significant impact on your final grade. **It is your responsibility to ensure that your clicker is registered at the start of each class.** The teaching resource center can provide technical help if you required. There are no appeals for failed clicker registration.

Grading

Midterm I (February 11 th , in class)	30%
Midterm II (March 5 th , in class)	30%
Final (March 22 nd 8:00-10am)	<u>40%</u>
(Final is comprehensive)	100%

Although the course is graded on a *curve*, you are guaranteed the following *minimum* grades: 90-100% = A- to A. 80-89% = B- to B+, 70-79% = C- to C+, 60-69% = D, 0-50% =F. Students receiving less than 40% of the total points will not pass the course.

Review Sessions for Midterms and Final

Review sessions will be conducted on the following dates: February 9th and 10th; March 3rd and March 4th. The review session for the final exam and the rooms and times for midterm reviews will be announced in lecture and on the website.

Course Material Covered by Exams

Questions on exams will be derived from 3 sources: 1) the assigned readings in Cell and Molecular Biology, 2) lectures (including “clicker” questions), and 3) problem sets. Not all material covered in lectures is in the textbook and not all material assigned in the textbook will be covered in lectures.

EXAMS will be scantron exams. You must bring a UCD2000 scantron form purchased from the bookstore to each exam as well as a supply of sharpened #2 pencils.

Problem Sets: One problem set will be assigned before each midterm exam. These will not be graded. They are designed to help you prepare for exams. Some material covered in problem sets may not be covered in lectures or the text. The reading assignments and questions will be posted on SmartSite, under “Resources”.

Discussion section: Each week a discussion section will be given by the TA. The discussion sections will consist of a 15-30 minute re-cap of material covered in the previous week’s lectures followed by time for questions. All discussion sections are OPTIONAL. The discussion sections

are a good time to catch up on concepts or details that you did not understand in lecture or in the reading. Questions about any course material can be asked during discussion sections.

Regrade Policy

Scantron forms will not be returned. You will keep the question part of your exam and it is your responsibility to write your answers on the questions so that you can check your answers against the posted answer key. An answer key will be available on the class web site. **Scores will be posted to your “Smartsite” course page. Written requests for re-grades must be submitted to Dr. Kaplan or the TA by the second lecture after scores are posted. No grade changes of any kind will be considered after the deadline even if you are sick or out of town.** If a mistake is found in an answer key, the scores of all students will be adjusted rather than just the scores of those submitting a re-grade request. There will be no re-grades of the final exam and no requests for grade changes will be accepted after final grades are submitted to the Registrars Office.

Taking exams outside of scheduled times

Anyone requiring extra time for an exam because of a disability must present written documentation to Dr. Kaplan by the end of the second week of class (Monday, January 21st). Anyone missing an exam without prior permission from Dr. Kaplan or a letter from a doctor demonstrating a medical *emergency* (the note has to state there was “an emergency that prevented [your name] from attending the exam on [date of exam].) will be assigned a grade of 0 (zero) for that exam. All doctor’s letters must be submitted to Dr. Kaplan for approval within seven days of the missed exam.

Prerequisites:

It is expected that you have the equivalent knowledge of a student who has recently gotten a B or better in BIS 101 and BIS 102. If you do not have this level of preparation, it is your responsibility to learn this material yourself. **If you are not prepared for this class, please consider dropping before the deadline.**

Incompletes

Incompletes will be assigned only to those with a grade of 70% or better at the time of the request and with written documentation of a medical emergency.

Lecture #	General Topic	Subtopics	Chapter (ch.section, pages)	Date
1	What do we want to know about cells?	<u>Techniques</u> used to study cells: immunoblots	18.14 and pp. 755-757	1/7
2		<u>Techniques</u> used to study cells: Microscopy	18.1 to 18.3	1/9
3/4		<u>Techniques</u> used to study cells: Pulse-Chase Experiment	8.2	1/11 1/14
5	How cells compartmentalize their function	<u>Cell Membranes</u> : Phospholipid bilyaer	4.1 – 4.3	1/16
		<u>Cell Membranes</u> : Ion channels and membrane potentials	4.4 - 4.7	1/18
6	Martin Luther King, Jr. Day			1/21
7	Protein Secretion/Trafficking	<u>Secretory pathway</u> : Overview	8.1	1/13
8		<u>Secretion/Trafficking</u> Signal peptides	8.3	1/25
9		<u>Secretion/Trafficking</u> ER translocation: SRP, translocation, BIP,	8.3	1/28
10		<u>Secretion/Trafficking</u> ER translocation: Scavenger pathway	8.3 – 8.4	1/30
11		<u>Secretion/Trafficking</u> Vesicular transport: Coats, ARF, SNAREs	8.5	2/1
12		<u>Secretion/Trafficking</u> Vesicular transport: Examples: KDEL,	8.5	2/4
13		<u>Secretion/Trafficking</u> Vesicular transport: lysosomal hydrolases, endocytosis	8.6, 8.8	2/6
14		<u>Secretion/Trafficking</u> Non-secretory transport: Mitochondrial and nuclear import	8.9 pp 495-498	2/8
	Midterm I	Lectures 1-12, problem set 1 and assigned reading	18, 4, 8, pp495-498	2/11

15	Regulation of cell shape and internal organization	<u>Cytoskeleton:</u> Actin, tubulin and intermediate filaments	9	2/13
16		<u>Cytoskeleton:</u> Actin, tubulin and intermediate filaments	9	2/15
17	Presidents Day			2/18
18		<u>Cytoskeleton:</u> Actin, tubulin and intermediate filaments	9	2/20
19		<u>Cytoskeleton:</u> Actin, tubulin and intermediate filaments	9	2/22
	How cells divide and Coordinate cytoskeleton regulation with cell division	<u>Cell Division:</u> Cell cycle control	14	2/21
20		<u>Cell Division:</u> Cell cycle control	14	2/25
21		<u>Cell Division:</u> Mitosis and cytokinesis	14	2/27
22		<u>Cell Division:</u> In stem cells and complex tissues	See posted reading	2/29
23	How cells process information about their surroundings	<u>Signaling:</u> Types of receptors	15	3/3
	Midterm II Lectures 12-22, problem set II and assigned reading			3/5
24		<u>Signaling:</u> Signal Transduction: 7-transmembrane receptors	15	3/7
25		<u>Signaling:</u> Signal Transduction: Tyrosine kinase receptors	15	3/10
26		<u>Signaling:</u> Signal Transduction: MAP kinase pathway	15	3/12
27		Transition from normal to cancer cell	16	3/14
28		Transition from normal to cancer cell	16	3/17

	Final Exam Comprehensive: Study your 2 midterms, focus on lectures 24-28	March 22 nd , 8:00am-10am		